

Brookhaven National Laboratory



Funding P2 Opportunities The Return-on-Investment Program

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Brookhaven Science Associates
U.S. Department of Energy



Presentation Overview

Purpose:

- Share information with other DOE Sites

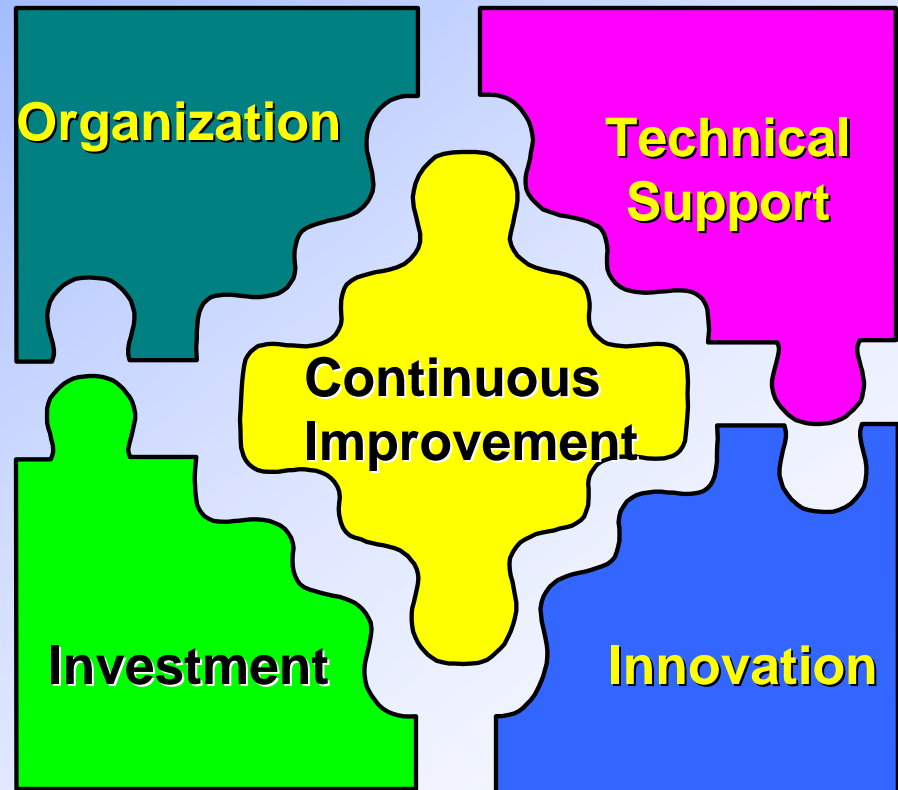
Topics:

- Overview of the BNL P2 Program
 - Structure
 - Organization: P2 Council
 - Technical support: Environmental Compliance Reps
- Results
- Summary & Resources

Structure of the BNL P2 Program

see <http://www.bnl.gov/esd/pollutionpreve>

- P2 Program Manager
 - Establish strategy, goals, budget
 - Monitor performance
- P2 Council
 - Shares the power
 - One rep from each Directorate
 - Allocates investments
- Return-On-Investment Program
- Environmental Compliance Representatives
- Engaging the Line Organizations



P2 Council

<https://sbms.bnl.gov/ld/ld16/ld16d391.htm>

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...PROTECTING ITS FUTURE

Charge: *Assist with development, establishment, management, and promotion of Lab-wide pollution prevention and waste minimization program.*

Structure: One representative from each BNL directorate (11)

Key Roles:

- Communication: Two-way information exchange
- Employee involvement & awareness
- Develops ranking criteria
- Shared decision making, allocate funding
- Systematic approach

Return on Investment Program: Establishing Ranking Criteria

- Establish ranking criteria to support strategic objectives
 - The project eliminates or significantly reduces a priority waste stream. Priority waste streams are Mixed Waste, Radioactive Waste, and Hazardous Waste.
 - The project eliminates or significantly reduces the use of toxic, radioactive, and/or hazardous materials, particularly chemicals and ozone-depleting substances targeted for reduction by Section 503 and Section 505 of [Executive Order 13148](#).
 - The project corrects or prevents noncompliance and/or eliminates or significantly reduces environmental regulatory requirements in support of Section 303 of Executive Order 13148.
 - The project supports and is aligned with the Laboratory Critical Outcomes and Performance Measures.
 - The project has a good return on investment (ROI). ROI will be calculated by determining the [PAYBACK PERIOD](#). The calculation of payback period is performed by dividing the Total Project Cost by the Annual Project Savings. A three year payback period will be considered a 'good' ROI.
 - The project eliminates a source of mercury.
 - The project has a high likelihood of successful implementation.
 - The project can be implemented within the fiscal year.

Technical Assistance Environmental Compliance Reps (ECRs)

■ Field Deployed Environmental Experts

- “Embed environmental compliance expertise in BNL Departments and facilities to identify and resolve environmental issues and pollution prevention opportunities at the earliest stage of project development”

■ Qualifications

- Minimum of five years compliance experience, B.S. Science or engineering, demonstrated problem solvers, pollution prevention

■ Deployment

- Program is fully staffed (5), with an ECR assigned to every facility on-site
- Fully integrated into the departments they serve, participating in work planning, experimental review, inspections, facility design, etc.

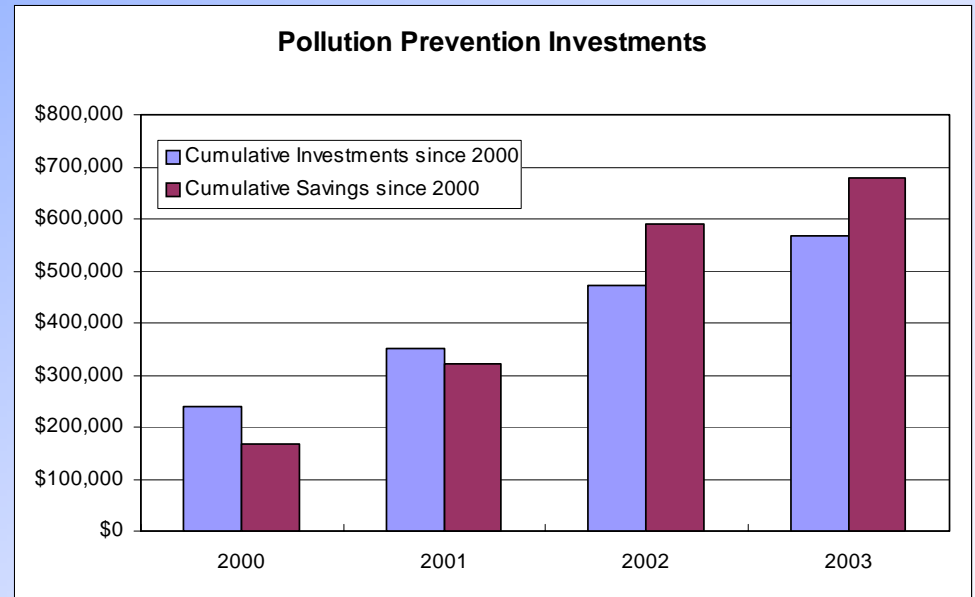
■ Assist Line Organizations

- Identifying opportunities
- Developing funding requests (proposals)

Return-On-Investment Program

<http://www.bnl.gov/esd/pollutionpreve/P2ROI.htm>

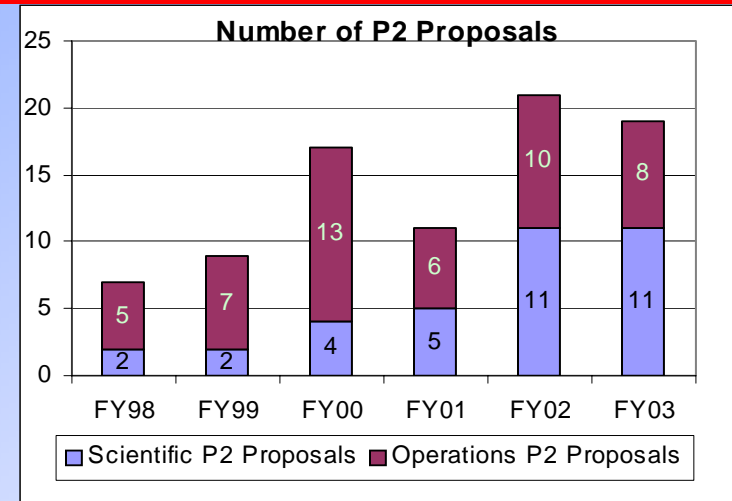
- ROI Program invests in projects that.....
 - Reduce waste via process changes, substitution, etc.
 - Save money and improve capabilities
 - Reduce risk (safety, regulatory, public)
- ROI Program is Overhead Funded
 - Management support
 - Results, Results, Results!!!!!!!
- P2 Council
 - Leads this effort labwide
 - Establishes ranking criteria
 - Ranks proposals
 - Votes on how to allocate investments



- BNL invested \$120K/yr in FY02 & FY03, \$60K in FY04
 - Average project returns investment in about one year

Engaging Scientific Staff in P2

- **EMS increasing participation labwide**
 - Objectives & Targets drive improvement
 - ROI program invests for future
- **Work Planning Processes**
 - Experimental Review generating new ideas
 - ECR involvement spreads good ideas
- **Annual cost savings from P2 projects**
 - \$88,000 in FY03
 - \$268,000 in FY02
- **P2 Program is Expanding**
 - Awareness and participation is increasing
 - Cost savings are accumulating
 - Capabilities are improving



P2 Proposal Trend

- Note increase from Science
- Cultural breakthrough

FY02 Funded P2 Proposals



Rank	Project Name	Directorate, Dept/Div and POC	Cost	Savings
1	Minimization of Silver Waste from Silver-Staining Electrophoretic Mini-Gels	Life Sciences, Biology (B. Sutherland)	\$1,670	\$30,860
2	Retrofit of Garbage Truck Hydraulics With Steel-braded Hydraulic Lines and a Vegetable Based Hydraulic Oil	Finance & Admin, Staff Services (K. Mohring)	\$7,500	\$15,000
3	Evaluation of CO2 Snow Cleaning for NSLS, Instrumentation and CAD applications	NSLS, Instrumentation, and CAD (D. Bauer)	\$5,000	see text
4	Retrofit of Hydraulic Lift Bays in Motor Pool Shop to Vegetable Based Hydraulic Oil	Finance & Admin, Staff Services (K. Mohring)	\$8,000	\$25,000
5	Sewage Treatment Plant (STP) Drying Shed	Facilitis & Operations, Plant Engineering (G. Olsen, G. Flett)	\$25,000	\$120,000
6	Replacement of Film-based Autoradiography and other radioisotopic imaging with a Phosphor Imager	Life Sciences, Medical (A. Gifford)	\$25,000	\$22,000
7	Reduction of hazardous, radioactive and industrial waste with a digital imaging system	Life Sciences, Biology (Dax Fu)	\$25,000	\$25,000
8	Development of a fluorescence-based assay for the DNA-dependent protein kinase (DNA-PKcs) to replace current 32P assay	Life Sciences, Biology (J. Flanagan)	\$22,000	\$30,000
TOTAL INVESTED			\$119,170	
TOTAL SAVINGS				\$267,860
AVERAGE PAYBACK PERIOD				

FY03 Funded P2 Proposals



Rank	Project Name	Directorate, Dept/Div and POC	Cost	Savings	Payback (Years)
1	Radioactive Waste Sorting Table	High Energy Nuclear Physics, CAD (J. Scott)	\$2,500	\$5,000	0.5
2	Reducing Dose From BLIP Air Emissions	Life Sciences, Medical (L. Mausner)	\$13,400	\$13,450	1
3	Kinetic Phosphorescence Analyzer	EENS, Environmental Sciences Dept. (J. Gillow)	\$20,000	\$22,556	0.9
4	Scintillation Vial Crusher	Life Sciences, Medical (A. Gifford)	\$3,795	\$2,168	1.75
5	Microplate Scintillation Counter	Life Sciences, Biology (J. Shanklin)	\$35,000	\$27,690	1
6	RTF Photoprocessor	Life Sciences, Medical (L. Wielopowski)	\$13,860	\$16,489	0.8
7	Oil-free Vacuum Pumps and new Catalyst	EENS, Environmental Sciences Dept. (L. Nunnermacker)	\$6,000	\$3,516	1.7
8	Bulk Motor Oil	F&A, Staff Services (H. Hauptman)	\$4,000	\$2,200	1.8
TOTAL INVESTED			\$96,055		
TOTAL SAVINGS				\$88,069	
AVERAGE PAYBACK PERIOD					1.2

FUNDED FY03: Microplate Scintillation & Luminescence Counter

■ Biology Department

- Reduced mixed and rad waste generation
- Greatly increased productivity (200 hrs/year)



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New system uses 200 μ l samples loaded into 96-well microplates. Entire plate takes 15 minutes to count (~6 seconds per sample)



Current system uses 3ml samples each loaded into individual vials requiring 3 minutes each to count



Cost: \$35,000

Annual Savings: \$28,000 +

Benefits:

- Eliminates 28 lit Mixed Waste
- Eliminates 6 cuft Rad Waste
- Many other potential uses

Status: Completed!

Life Sciences

FY02 Funded P2 Proposal: Silver Waste Reduction



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Pollution Prevention Fact Sheet

Pollution Prevention Project Proposal



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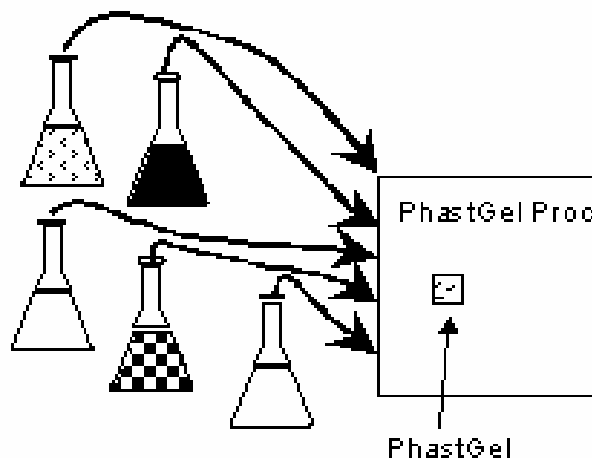
Title: Minimization of Silver Waste from Silver-Staining Electrophoretic Mini-Gels¶

Graphic Description: ¶

AP BioTech PhastGel Developing System¶

Fix/Stain/Wash/Develop/Stop Solutions

All effluents are HAZARDOUS WASTE
due to mixing in chamber



1. Fix: 0.7% benzene sulfonic acid 24% ethanol
2. Stain: 0.2% silver nitrate, 0.07% benzene sulf
3. Wash: distilled water (80 ml)
4. Develop: 2.5% sodium carbonate, 0.002% sod
5. Stop/Preserve: 1% acetic acid, 10% glycerol, 5
6. Wash all ports with 40 ml water each. (total 20

Cost: \$1670

Annual Savings: \$30k +

Benefits:

- Reduce hazardous waste
- Decrease safety hazards
- Reduce materials cost

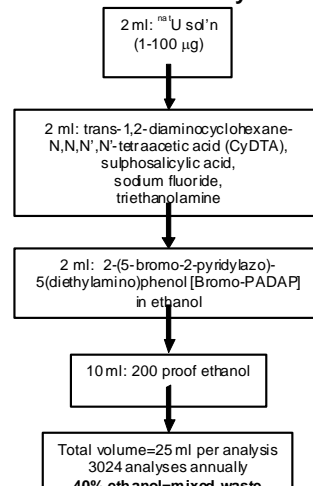
Status: Completed!

FUNDED FY03: Elimination of mixed waste Kinetic Phosphorescence Analyzer (KPA) system

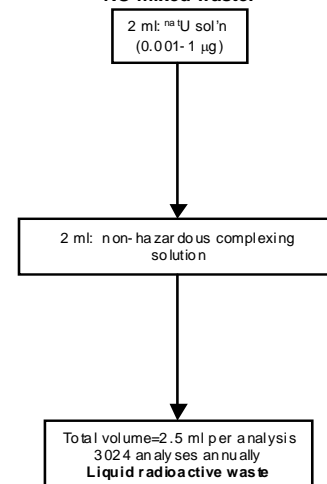
■ Environmental Sci Dept

- Total elimination of mixed waste (Uranium)
- Lower detection limit
- Increased productivity from autosampler

Current Wet-Chemistry Method:
Generates 75.6 L (2.7 cft) of mixed waste annually.



Proposed KPA Method: Will generate 7.6 L (2 gal.) of liquid rad. waste annually and **NO mixed waste.**



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Cost: \$20,000

Annual Savings: \$22,560k +

Benefits:

- Eliminates 75 lit Mixed Waste
- Reduces rad handling 90%
- Reduce materials cost

Status: Completed!

The Bottomline

- P2 Program is key element of EMS
 - Reduce waste, cut costs, improve capabilities, reduce regulatory requirements, save time and materials
- Invest for Improvement
 - Important source of improvement funding
 - BNL Management support is essential
- Share the power
 - Create a P2 Council, with broad representation, decision authority
- Track and Report the Results
 - Track and publicize the cost savings and waste reduction
- Recognize the Superstars

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Resources

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■ BNL

- P2 Web Page, <http://www.bnl.gov/esd/pollutionpreve>
- George Goode: goode@bnl.gov, 631-344-4549
- Peter Pohlot: pohlot@bnl.gov, 631-344-5660
- Glen Todzia: todzia@bnl.gov, 631-344-7488

■ BNL Work Planning and Control

- <https://sbms.bnl.gov/standard/3k/3k00t011.htm>

■ BNL Environmental Management System Manual

- <https://sbms.bnl.gov/program/pd02/pd02d011.htm>